

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (WELDING & METALWORK): GRADE 12 (TERM 1)

TERM 1	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11		
CAPS TOPICS	Safety	Safety	Safety	Terminology (specific)		Tools (specific)		Materials		Revision	Assessment		
TOPICS/CONCEPTS, SKILLS AND VALUES	First Aid HIV/Aids Awareness OHS Act Machine-specific safety measures	Knowledge of basic First Aid measures: Analyse the OHS Act and regulations where applicable to the following machines: <ul style="list-style-type: none"> Grinding machines (portable, bench and surface) Cutting (drilling machines, power saw, band saw) Shearing machines (manual and power driven) Press machines Joining (arc, gas) Handling and usage of gas cylinders 	Knowledge and application of basic workshop layouts: <ul style="list-style-type: none"> Process layout Product layout Referring to the OHS Act, analyse the responsibilities of the: <ul style="list-style-type: none"> Employer Employee Practical: Compare the process and product layout of two different manufacturing or maintenance workshops	Templates: <ul style="list-style-type: none"> Marking off templates, full or part Sets of roof trusses, beams, lattice girders and plate girders Method of obtaining and transferring dimensions Calculations of sheet metal for rolling and bending: <ul style="list-style-type: none"> Rolled plate Rectangular and square plate Practical: Do calculations on rolling and bending plates	Application of WELDING SYMBOLS: All the welding symbols according to the Code of Practice for welding – SANS Practical: Apply the welding symbols as indicated on a given sketch according to SANS to produce a project from a template	The principles and functions of the following purpose-made tooling and equipment: <table border="1" style="width: 100%;"> <tr> <td> <ul style="list-style-type: none"> Stocks and die (characteristics and drill sizes) Grinding machines (portable, bench) Cutting machines (drilling machines, power saw, horizontal band saw) Guillotine machine (manual and power saw) Press machines Joining equipment (arc, spot, gas) </td> <td> <ul style="list-style-type: none"> Rolling machine Punch and cropper machine Plasma cutter Brinell and Rockwell hardness testers Moments and forces testers Tensile testers MIG/MAG welders </td> </tr> </table>		<ul style="list-style-type: none"> Stocks and die (characteristics and drill sizes) Grinding machines (portable, bench) Cutting machines (drilling machines, power saw, horizontal band saw) Guillotine machine (manual and power saw) Press machines Joining equipment (arc, spot, gas) 	<ul style="list-style-type: none"> Rolling machine Punch and cropper machine Plasma cutter Brinell and Rockwell hardness testers Moments and forces testers Tensile testers MIG/MAG welders 	Identify materials by: <ul style="list-style-type: none"> Sound test Bending test Filling test Machine test Practical: Identify material types by using sound, bending, filling and machining tests	Methods of enhancing the properties of steel (only heated temperature and cooling apply): <ul style="list-style-type: none"> Tempering Case hardening Hardening Annealing Normalising Practical: Do enhancement on materials by applying tempering on cutting tools and hardening soft carbon steel		Assignment
<ul style="list-style-type: none"> Stocks and die (characteristics and drill sizes) Grinding machines (portable, bench) Cutting machines (drilling machines, power saw, horizontal band saw) Guillotine machine (manual and power saw) Press machines Joining equipment (arc, spot, gas) 	<ul style="list-style-type: none"> Rolling machine Punch and cropper machine Plasma cutter Brinell and Rockwell hardness testers Moments and forces testers Tensile testers MIG/MAG welders 												
ASSESSMENT	SBA (FORMAL)	ASSIGNMENT PAT - Phase 1 The legislation governing workplaces in relation to COVID- 19 is the Occupational Health and Safety Act, Act 85 of 1993, as amended, read with the Hazardous Biological Agents Regulations. Section 8 (1) of the Occupational Health and Safety (OHS) Act, Act 85 of 1993. Safe work practices are types of administrative controls that include procedures for safe and proper work used to reduce the duration, frequency, or intensity of exposure to a hazard. Examples of safe work practices for SARS-CoV-2 include: Requiring regular hand washing or using of alcohol-based hand rubs. Learners and teachers should always wash hands when they are visibly soiled and after removing any PPE. Keep safe distances and wear a mask at all times. See the document on the workshop safety measures											

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (WELDING & METALWORK): GRADE 12 (TERM 2)

TERM 2	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11			
CAPS TOPICS (NO DEVIATIONS FROM CAPS)	Forces (specific)				Joining methods (inspection of welds) (specific)				PAT consolidation	MID-YEAR EXAM				
TOPICS/CONCEPTS, SKILLS AND VALUES	<p>FORCES AND MOMENTS: Effects of forces and moments on engineering components applying design principles: STEEL WORKS: Determine graphically the magnitude and nature of forces on the members of frameworks with a maximum of 11 (eleven) parts. (Only parallel and vertical loads). Calculate the reactions</p>		<p>FORCES AND MOMENTS: Basic calculations on:</p> <ul style="list-style-type: none"> • Moments found in engineering components (by calculation only) • A simple support beam with two vertical point loads and one uniformly distributed load (UDL) acting on the beam (including reactions at the support) • A simple supported beam with three vertical point loads and without uniformly distributed load (UDL) acting on the beam • Calculate the reactions at the supports • Calculate the bending moments at each and shear forces between points <p>DRAW THE FOLLOWING DIAGRAMS TO SCALE:</p> <ul style="list-style-type: none"> • Space diagram • Bending moment diagram • Shear force diagram 		<p>STRESS AND STRAIN (Calculation of):</p> <ul style="list-style-type: none"> • Stress and strain (Hooke's law) • Comprehensive/ tensile stresses • Young's modulus of elasticity (include the factor of safety) • Determine change in length (Δl) • Stress/strain diagram <p>Practical: Do calculations on stress and strain whilst taking into consideration Young's modulus for each material</p>		<p>INSPECTION OF WELDS: (inspection during and after completion of oxy-acetylene and arc welding):</p> <ul style="list-style-type: none"> • Clean bead • Constant width and height of bead • Presence of pits • Undercutting • Distortion • Cracks • Spatter • Slag inclusion • Start and termination of weld • Correct flame • Pressure • Current <p>Application of destructive tests on welded joints:</p> <ul style="list-style-type: none"> • Nick break • Nick bend • Machinability tests <p>Practical: Perform destructive tests on a welded joint using nick break, nick bend and machinability test to identify defects</p>		<p>INSPECTION OF WELDS: Describe and compare the following non-destructive tests:</p> <ul style="list-style-type: none"> • Visual inspection • X-rays • Dye penetration • Ultrasonic test <p>Practical: Perform the above non-destructive tests on a welded joint to identify defects</p>		<p>INSPECTION OF WELDS: Stresses and distortion in welding and stress relieving:</p> <ul style="list-style-type: none"> • Shrinkage of welded joint • Identify the factors affecting distortion and residual stress • Methods to prevent or reduce distortion and stress • Identify and apply stress-relieving heat treatment processes • Describe the effect of change in temperature on steel <p>Practical: Identify the factors that lead to distortion and residual stresses within a welded joint</p>		PAT - Phase 2	
SBA (FORMAL)	<p>EXAMINATION PAT - Phase 2 Occupational Health and Safety Act, Act 85 of 1993, as amended, read with the Hazardous Biological Agents Regulations. Section 8 (1) of the Occupational Health and Safety (OHS) Act, Act 85 of 1993 Safe work practices are types of administrative controls that include procedures for safe and proper work used to reduce the duration, frequency, or intensity of exposure to a hazard. Examples of safe work practices for SANS: Requiring regular hand washing or using of alcohol-based hand rubs. Learners and teachers should always wash hands when they are visibly soiled and after removing any PPE. Keep safe distances and wear a mask at all times See the document on the workshop safety measures</p>													

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TERM 3		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	
CAPS TOPICS (NO DEVIATIONS FROM CAPS)		Maintenance (specific)			Terminology (development) (specific)						Trial exam	Trial exam	Trial exam
TOPICS/CONCEPTS, SKILLS AND VALUES		<p>Suitable preventative maintenance in operating systems for guillotine, pedestal drill, power saw</p> <p>Identify causes of malfunction of:</p> <ul style="list-style-type: none"> Lack of lubrication or incorrect lubrication Overloading friction 	<p>Suitable preventative maintenance in operating systems for roller, punch and shearing machine and pedestal grinder</p> <p>Identify causes of malfunction of:</p> <ul style="list-style-type: none"> Lack of lubrication or incorrect lubrication Overloading friction 	<p>Marking off template by calculation only of the following between horizontal parallel planes:</p> <p>A cone frustum of slight taper</p>	<p>Marking off template by calculation only of the following between horizontal parallel planes:</p> <p>A cone frustum of slight taper</p>	<p>Marking off template by calculation only of the following between horizontal parallel planes:</p> <p>Square to round transformers (on centre only)</p>	<p>Marking off template by calculation only of the following between horizontal parallel planes:</p> <p>Square to round transformers (on centre only)</p>	<p>Marking off template by calculation only of the following between horizontal parallel planes:</p> <p>Hoppers with square or rectangular openings (on and off centre)</p>	<p>Marking off template by calculation only of the following between horizontal parallel planes:</p> <p>Hoppers with square or rectangular openings (on and off centre)</p>				
		Practical: Perform periodic maintenance as prescribed by manufactures on specific machines			Practical: Do calculations on cone frustum, square to round transition and hoppers								
ASSESSMENT	INFORMAL ASSESSMENT: REMEDIATION	Classwork/case studies/worksheets/homework/class tests (theory and practical work)											
	SBA (FORMAL)	<p>Preparatory examination</p> <p>PAT - Phase 3 and 4 finalisation</p> <p>Occupational Health and Safety Act, Act 85 of 1993, as amended, read with the Hazardous Biological Agents Regulations. Section 8 (1) of the Occupational Health and Safety (OHS) Act, Act 85 of 1993. Safe work practices are types of administrative controls that include procedures for safe and proper work used to reduce the duration, frequency, or intensity of exposure to a hazard. Examples of safe work practices for SANS: Requiring regular hand washing or using of alcohol-based hand rubs. Learners and teachers should always wash hands when they are visibly soiled and after removing any PPE. Keep safe distances and wear a mask at all times. See the document on the workshop safety measures</p>											

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (WELDING & METALWORK): GRADE 12 (TERM 4)

TERM 4		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10
CAPS TOPICS (NO DEVIATIONS FROM CAPS)		Revision	Revision	Revision	Exams	Exams	Exams	Exams	Exams	Exams	Exams
ASSESSMENT	INFORMAL ASSESSMENT: REMEDIATION	Classwork/case studies/worksheets/homework/class tests (theory and practical work)									
	SBA (FORMAL)	Final examination								Exams	Exams